HETEROGAMASUS TRÄGÅRDH (ACARI: RHODACARIDAE), INCLUDING THE SUBGENUS EVANSSELLUS RYKE, stat. n.

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Text fig. 1-33

SUMMARY

Heterogamasus Trägårdh is redefined to contain two subgenera; *Heterogamasus* sens. str. from South America and *Evanssellus* Ryke from Australasia. A key is given for the identification of the five species. Two new species (*H.* (*H.*) *calcarellus* and *H.* (*E.*) *medusa*) are described, while the descriptions of the type-species (*H.* (*H.*) *claviger* Trägårdh), *H.* (*H.*) *spinosissimus* (Balogh) and *H.* (*E.*) *foliatus* (Ryke) are extended.

INTRODUCTION

The genus, *Heterogamasus*, was established by Trägårdh (1907) with *H. claviger*, a single male from the Falkland Islands, as the only species. Trägårdh suggested that the genus was closely related to *Gamasellus* Berlese and commented "the shape of the first pair of legs is a quite unparalleled feature". The first pair of legs are unusual in being long and as thick as the other legs, but mainly in possessing large, ventral spines. No species had since been added to the genus, but *Evanssellus foliatus* Ryke, 1961 and *Gamasellus* (?) *spinosissimus* Balogh, 1963 are similar to *Gamasellus* and have unusual first legs like *Heterogamasus*. I have, therefore, placed these two species and two new species in *Heterogamasus*.

All members of the genus have a reasonable number of characters in common and were collected in cool, wet, temperate areas between 38° and 54° South. In contrast to their similarities, the mites fall into two distinct morphological groups; one from South America and one from Australasia. *Evanssellus* Ryke, 1961, with the status of subgenus, is used for the latter, the former being the nominate subgenus. Some characters differentiating the subgenera have previously been "weighted" as important enough to separate genera within the Rhodacaridae. To support or contradict this is too much guess-work until it is possible to consider the large number of undescribed rhodacarid species and undescribed immature stages of named species. The similarities of the two subgenera to *Gamasellus*, with the unusual adaptation of leg I, which is sensory rather than ambulatory in

Gamasellus, but presumably in this case is also prehensile, is considered sufficient to group *Heterogamasus* and *Evanssellus* within one genus until more clearly indicated otherwise.

MATERIAL AND METHODS

Only the type material of *H. medusa* and the *H. foliatus* from Wellington, belonged originally to the South Australian Museum. One female paratype of *H. calcarellus* has since been given to the South Australian Museum by the British Museum (Natural History). The other type material of *H. calcarellus* belongs to the British Museum (Natural History). The paratype female and paratype male of *H. foliatus* were borrowed from the Institute of Zoological Research of Potchefstroom University. The holotype female of *H. spinosissimus* was borrowed from the Hungarian Natural History Museum, Budapest. The idiosoma and legs of the male holotype of *H. claviger* were borrowed from the Naturhistoriska Ricksmuseum, Stockholm.

The methods are as in Lee (1966) and the terminology is as in Evans and Till (1965) and Lindquist and Evans (1965), but individually labelled idiosomal setae in the figures are numbered as if their row was complete. The labelling of the ventral and lateral setae of the genu and tibia of leg I is as advised by Dr. G. O. Evans (personal communication, 1966).

Family RHODACARIDAE Oudemans, 1902

Genus **Heterogamasus** Trägårdh

Heterogamasus Trägårdh, 1907, p. 2. Type-species: *Heterogamasus claviger* Trägårdh, 1907, by monotypy.

Evanssellus Ryke, 1961, p. 17. *New synonymy.* Type-species: *Evanssellus foliatus* Ryke, 1961, by original designation.

This genus is confined to the *Rhodacarus*-group, mentioned by Evans (1963, p. 302), by the following characters. The leg chaetotaxy is of the type in which the setal formula of tibia I is usually (2-6/4-2). The apotele is three tined, with one tine reduced and without an associated hyaline flap. In the female the metasternal setae are on the sternal shield, except in *H. medusa* where they are absent. The genital shield is truncated posteriorly and separate from a ventrianal shield. In the male there is a distally free spermodactyl and an armed leg II.

Heterogamasus can be separated from all other rhodacarid genera by having large, spine-like av_2 and pv_2 on tibia I.

The following further characters are probably also shared by the whole genus. Few setae are simple in form. In most specimens, especially adult females, parts of the idiosoma and legs are covered with an exudate, which is not included in the drawings. A shallower, inner layer, which is also variable and hyaline, often forms a flap on the setae and appears to continue over the setal bases and onto the general body surface. This second layer, where it occurs on the setae figured below, has been drawn with a broken line.

Female. Gnathosoma. Anterior margin of tectum curves forward to central spine with multidenticulate margin. Six or seven rows of deutosternal denticles. Third pair of hypostomal setae noticeably longer than others. Palpgenu seta, al_3, at least slightly pilose. Ventral setae on palptrochanter and lateral setae on palpfemur somewhat spine-like, e_1 on the former is slightly pilose and *al* on latter is short.

Idiosoma. Two dorsal shields; posterior one discrete, anterior one fused anteriorly to peritrematic shield, which is fused posteriorly to exopodal IV. Single, discrete pair of prae-endopodal shields. Sternum only fused to endopodal II. Endogynial shield with convex, curved anterior margin. Genital shield discrete; anteriorly round and hyaline, posteriorly truncated. Ventrianal shield discrete. Dorsal chaetotaxy: 6*j*, 6*z*, 5*s*, 5*r*; 5*J*, 5*Z*, 5*S*, 6*R*. In *H. spinosissimus* there are also 3*UR*. Ten to 13 setae on venter, plus a pair of paranals and an unpaired postanal. Je_1 and Ze_1 small and setose, while some other setae on ventrianal shield always larger and differing in form.

Legs. Anterior legs larger than posterior legs. Chaetotaxy as in *Ologamasus* (see fig. 1, Lee (1966)), except on genu III and tibia III of *Heterogamasus* sens. str.

Male. Chelicerae have three teeth on fixed digit and one tooth on movable digit. Spermodactyl similar in shape to digits, but with dorsal groove. Peritrematic shield fused to ventrianal shield. Leg II is armed, but in *H. medusa* only *av* on femur is slightly modified to a spur.

Deutonymph. Both dorsal shields discrete. Chaetotaxy as adult, but some differences in idiosomal setal form.

Protonymph. Dorsal chaetotaxy; 6*j*, 3*z*, 2*s*, 4*r*; 5*J*, 5*Z*, 4*S*, 1*R*. Eight or seven pairs of setae on venter, plus a pair of paranals, an unpaired postanal and a pair of minute enanals. On genu I and tibia I, the anterior spine-like seta is *al* (note that only on genu I of the deutonymph and adult of *Evansellus* is it also a lateral seta).

KEY TO *HETEROGAMASUS* SPECIES

Since there are few species, and in *Heterogamasus* sens. str. only one sex in eaeh case, I have chosen characters whieh, it is hoped, apply to both males and females.

1. Genu III and tibia III chaetotaxy is (2-4/2-2) and (2-3/2-2). Reduced ambulacrum I, with small elaws but no pulvillus. Anterior spine on genu I is av_2. Vertieal setae ($j1$) not on prominent protruberanee — *Heterogamasus* sens. str. 2

   Genu III and tibia III ehaetotaxy is (2-4/2-1) and (2-3/2-1). No ambulacrum I. Anterior spine on genu I is al_1. Vertieal setae ($j1$) on prominent protruberanee .. — *Evanssellus* 4

2. Dorsal setae short, *e.g.*, in row *J* setal length is well under half distance between setae .. — *claviger* Trägårdh

   Dorsal setae longer, *e.g.*, in row *J* setal length is about, or more than, half distanee between setae .. .. — 3

3. Setae Zv_1, Jv_1, and row *R* on integument .. — *spinosissimus* (Balogh)

   Setae Zv_1, Jv_1, and row *R* on shields .. .. — *calcarellus* sp. n.

4. Metasternal setae (*st* 4) present. Most dorsal setae (all row *S*) leaf-like .. .. .. — *foliatus* (Ryke)

   Metasternal setae (*st* 4) absent. Most dorsal setae (all row *S*) tentacle-like . .. — *medusa* sp. n.

Subgenus **Heterogamasus** Trägårdh

The three species belonging to this subgenus are from South America. The adults range in idiosomal length from 560μ to 640μ.

The following eharacters (adult female, unless otherwise stated) distinguish this subgenus from *Evanssellus*. Movable digit of chelieera has three or four teeth. Central teetum spine bifureate at tip. Idiosoma convex dorsally and without anterior protruberanee bearing vertical setae ($j1$). The second seta in row *r* is small, while in most rhodacarids it is larger than the surrounding setae. Postanal pad fused to ventrianal shield. Paranal setae level with or slightly posterior to anterior margin of anus. Peritrematic shield elearly retieulated, except for small area arounrd eoxa IV, past whieh it extends some way posteriorly. Leg I has pretarsus, plus small claws and, in the protonymph, a small pulvillns. Chaetotaxy of genn III and tibia

III is as in *Cyrtolaelaps* Berlese; *i.e.*, (2-4/2-2) and (2-3/2-2). The anterior spine on genu I and tibia I, which is lateral in the protonymph, is av_2 in the deutonymph and adult. On femur IV, pd_2 (*pd* on protonymph) is largest seta. Male genu II obviously armed, with *av* as a spur. Holoventral shield in male consisting of sternogenital, ventrianal and peritrematic shields; an unusual condition when ventrianal shield is not fused to dorsal shield.

Heterogamasus (H.) claviger Trägårdh

1907, *Heterogamasus claviger* Trägårdh, p. 2; text figs. 1 and 2; pl. I, fig. 1, 2, 3, 6 and 8.

I have before me the idiosoma and five legs of the single male of this species, which according to Dr. E. Kjellander (personal communication, 1965) is all of the mite still in existence.

Male. Fig. 1-5. Idiosomal length, 640μ.

Dorsal plate has reticulations and dimples as shown over limited area in fig. 3; see pl. I, fig. 8 in Trägårdh (1907) for total distribution. Dorsal setae are short compared with other species, and, as in *H. spinosissimus*, some are on integument. Reticulations on holoventral shield absent from sternogenital area, and inside ridge running posteriorly from stigma. Five *Jv* and three *Zv* setae on side figured, but on left side the two most posterior setae are replaced by a single seta in the equivalent of a position midway between them; *i.e.*, *Jv*5 is missing.

Locality. Falkland Islands: holotype male under stones, east of Port Stanley, 25th February, 1902, coll. by Swedish South Polar Expedition of 1901-1903.

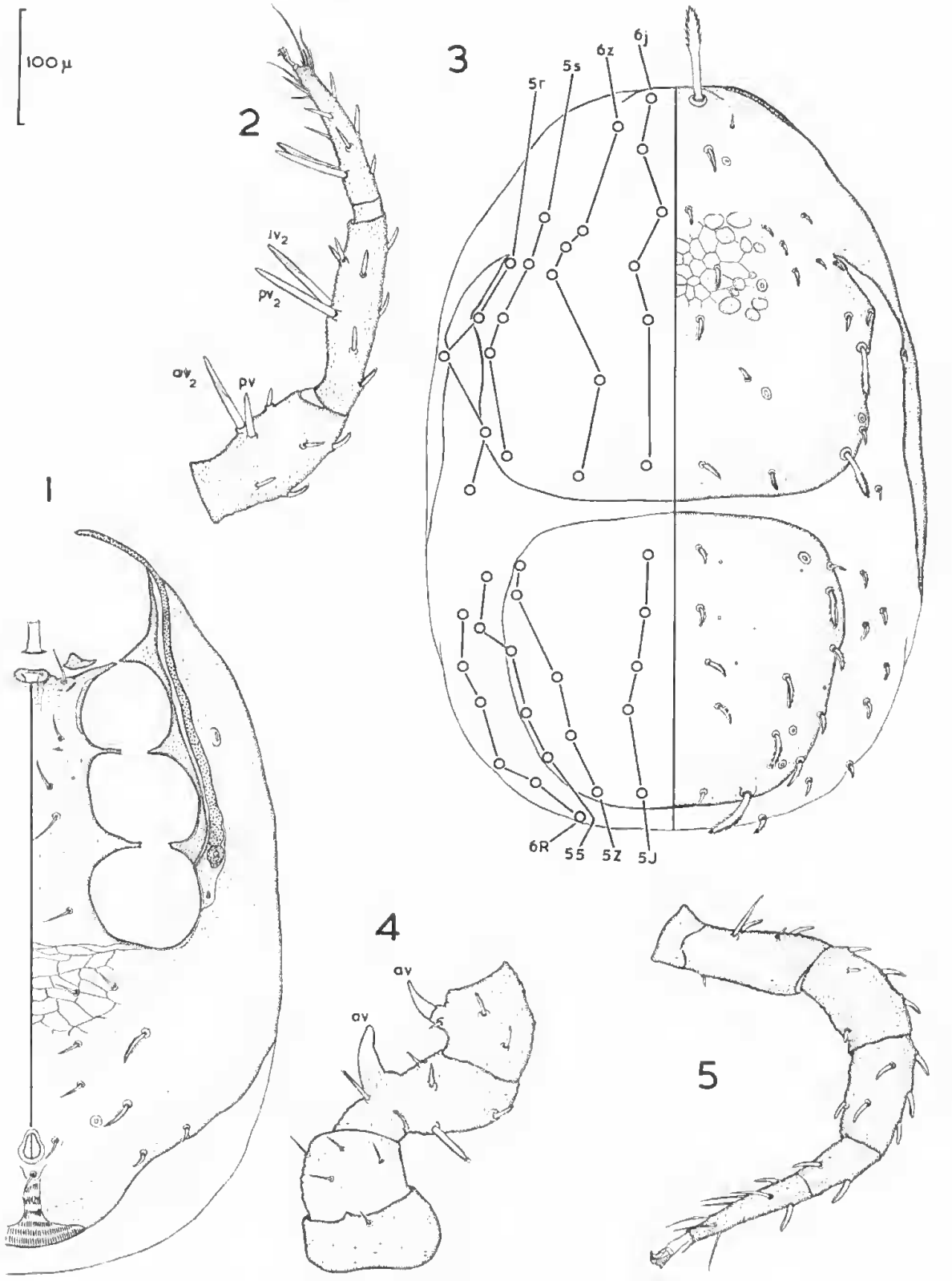
Heterogamasus (H.) spinosissimus (Balogh) comb. n.

1963, *Gamasellus* (?) *spinosissimus* Balogh, p. 489, fig. 18-23.

Female. Not figured. Idiosomal length, 560μ.

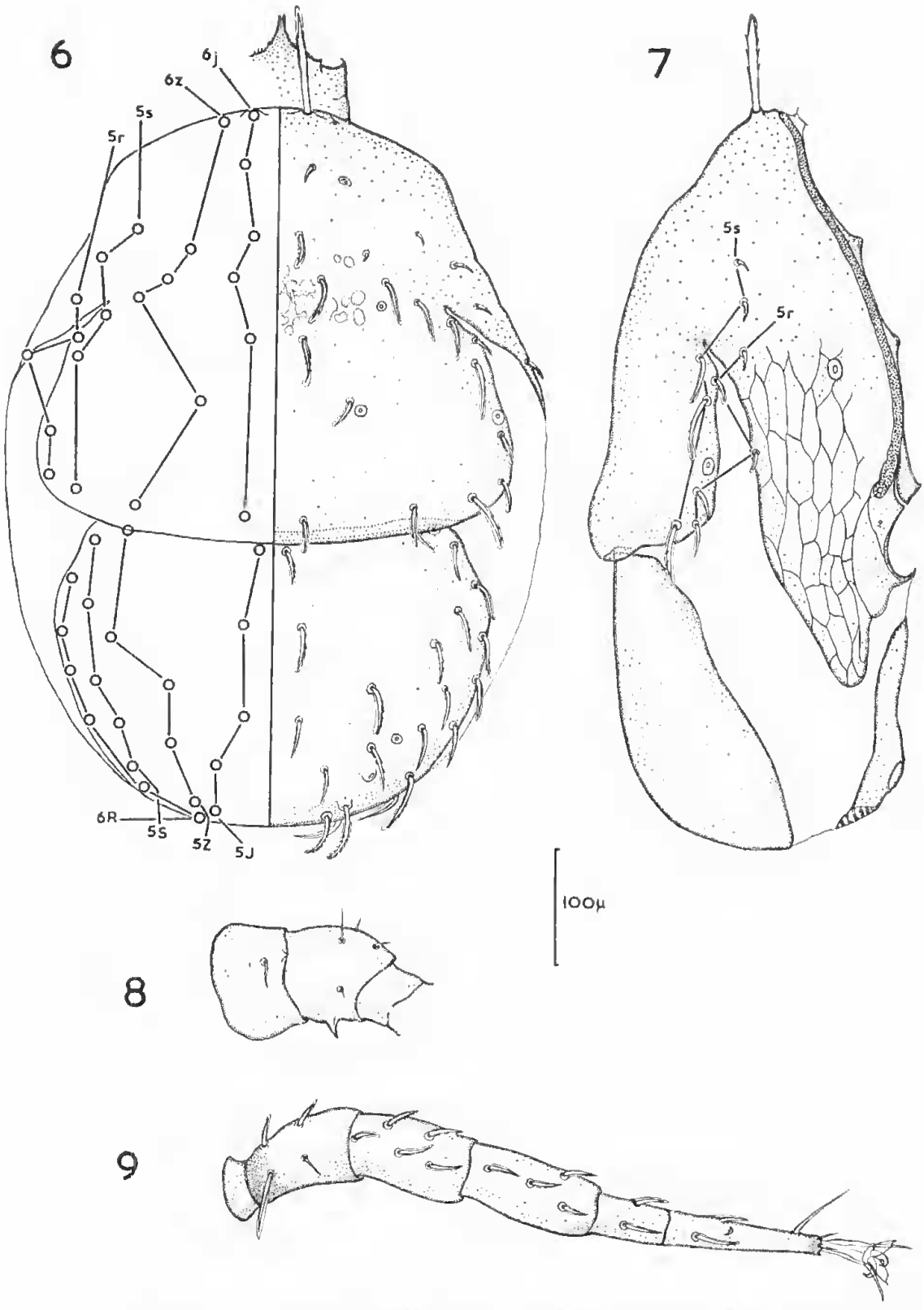
Three teeth on movable cheliceral digit. Having examined the holotype, I regard the idiosomal chaetotaxy as 6*j*, 6*z*, 5*s*, 5*r*; 5*J*, 5*Z*, 5*S*, 6*R*, 3*UR*; 5*st*, 4*Jv*, 3*Zv*. The 3*UR* pairs of setae being the most posterior, peripheral setae on Balogh's drawing (1963, fig. 19) of the venter. The other characters are in accordance with those of the subgenus.

Locality. Argentina: holotype female, 1 paratype female, from sifted litter, *Maytenus boaris* forest with *Berberis darwini* and *Nothofagus antarctica*, near spring, 1,150 m., Mt. Piltriquitron, El Bolsón, Rio Negro, 16th November, 1961, coll. by Gy Topál.



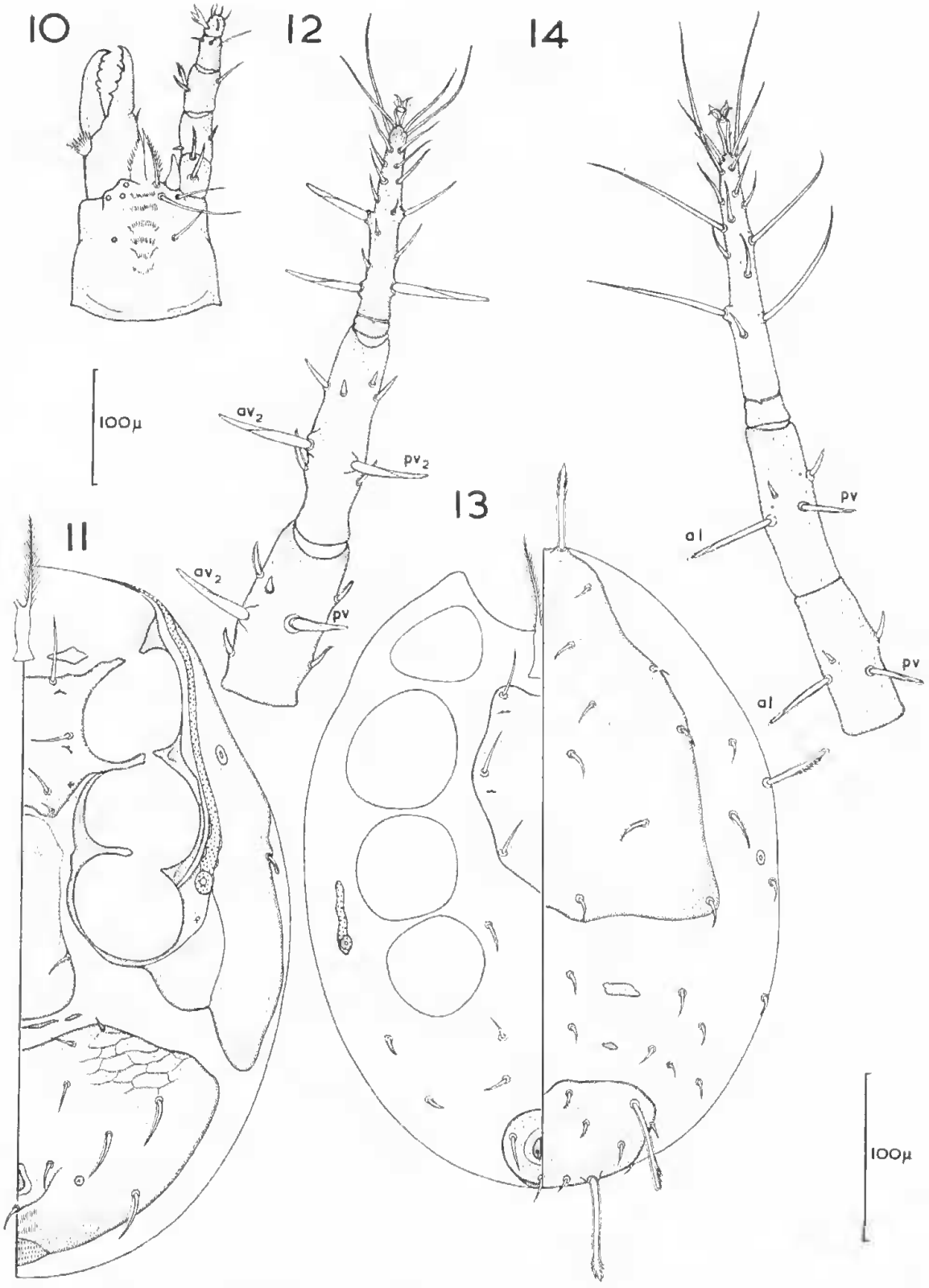
Figs. 1-5. *Heterogamasus* (*H.*) *claviger* Trägårdh, male.

1, venter; 2, distal segments from leg I; 3, dorsum; 4, proximal segments from leg II; 5, lateral view of distal segments from leg IV.



Figs. 6-9. *Heterogamasus* (*H.*) *calcarellus* sp. n., female.

6, dorsum; 7, lateral view of idiosoma; 8, ventral view of proximal segments from leg IV; 9, dorsal view of distal segments from leg IV.



Figs. 10-14. *Heterogamasus* (*H.*) *calcarellus* sp. n.
10-12, female. 10, ventral view of gnathosoma; 11, venter; 12, distal segments from leg I. 13 and 14, protonymph. 13, venter and dorsum; 14, distal segments from leg I.

Heterogamasus (H.) calcarellus sp. n.

Female, Fig. 6-12. Idiosomal length, 620μ.

Four teeth on movable cheliceral digit. Reticulations on peritrematic and ventrianal shields, but dorsal shields have only irregular dimples. The split between the peritrematic and anterior dorsal shield terminates just anterior to *s*3, as it does in *H. spinosissimus*. All idiosomal setae are normally on shields, but paratype female 2 has one *Zr*1 on integument of right side. The spines on leg II are very well developed. On trochanter IV, *p*1 is a small spur. Holotype female contained smooth, oval, unpigmented egg, 260μ x 200μ (length is nearly 42% of the length of the female idiosoma).

Protonymph. Fig. 13 and 14. Idiosomal length, 400μ.

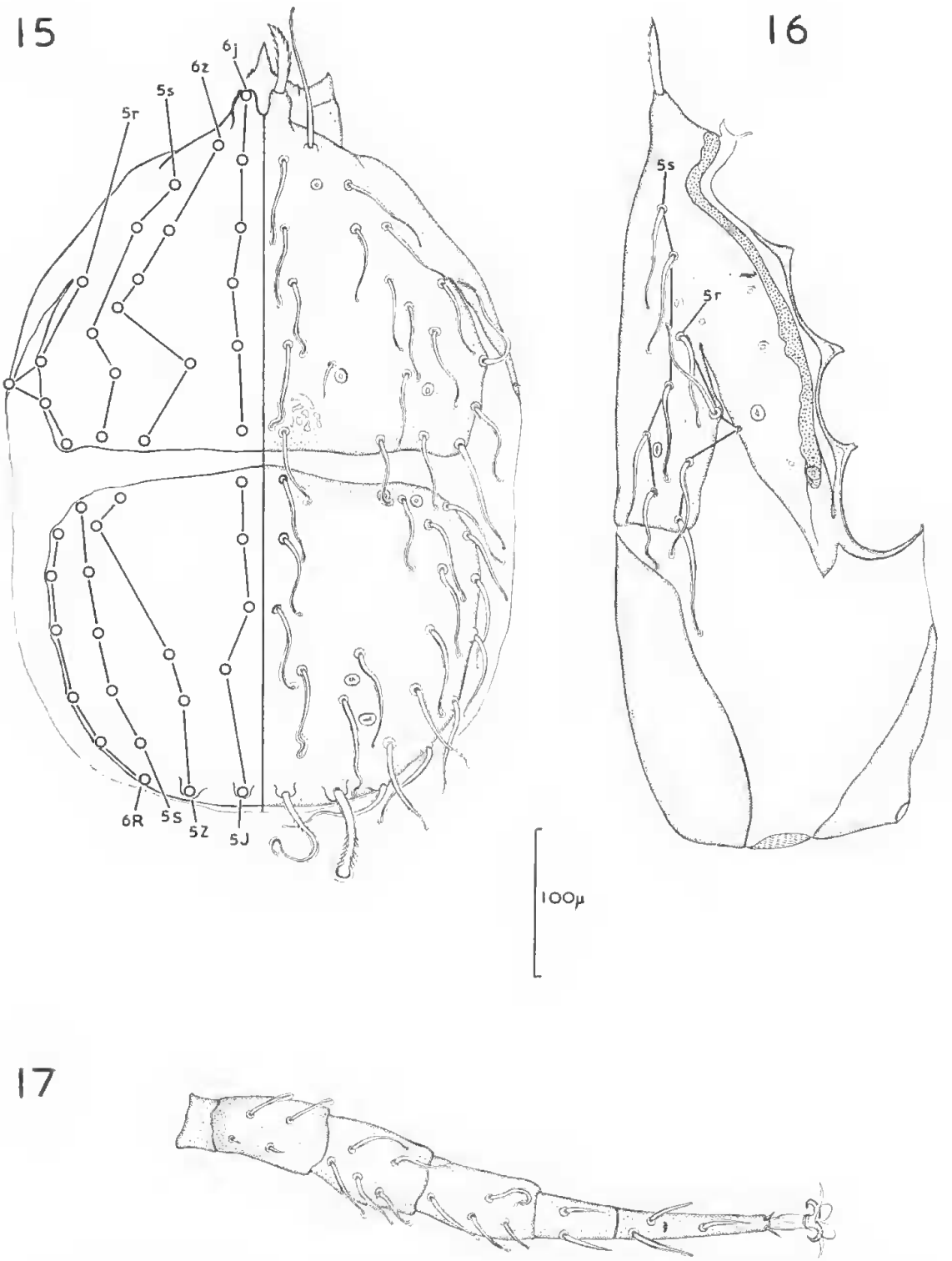
Chaetotaxy as in *H. medusa*, except that it is normal in having setal pair *st*5 present. Unlike the female, *r*2 is large and similar to *j*1. *Jr*3 and *Zr*1 are slightly spine-like compared with other ventral setae.

Locality. Tierra del Fuego: holotype female, morphotype protonymph, two paratype females from *Nothofagus* forest litter, Cordillera Darwin, 27th February and 1st March, 1962, coll. E. Shipton.

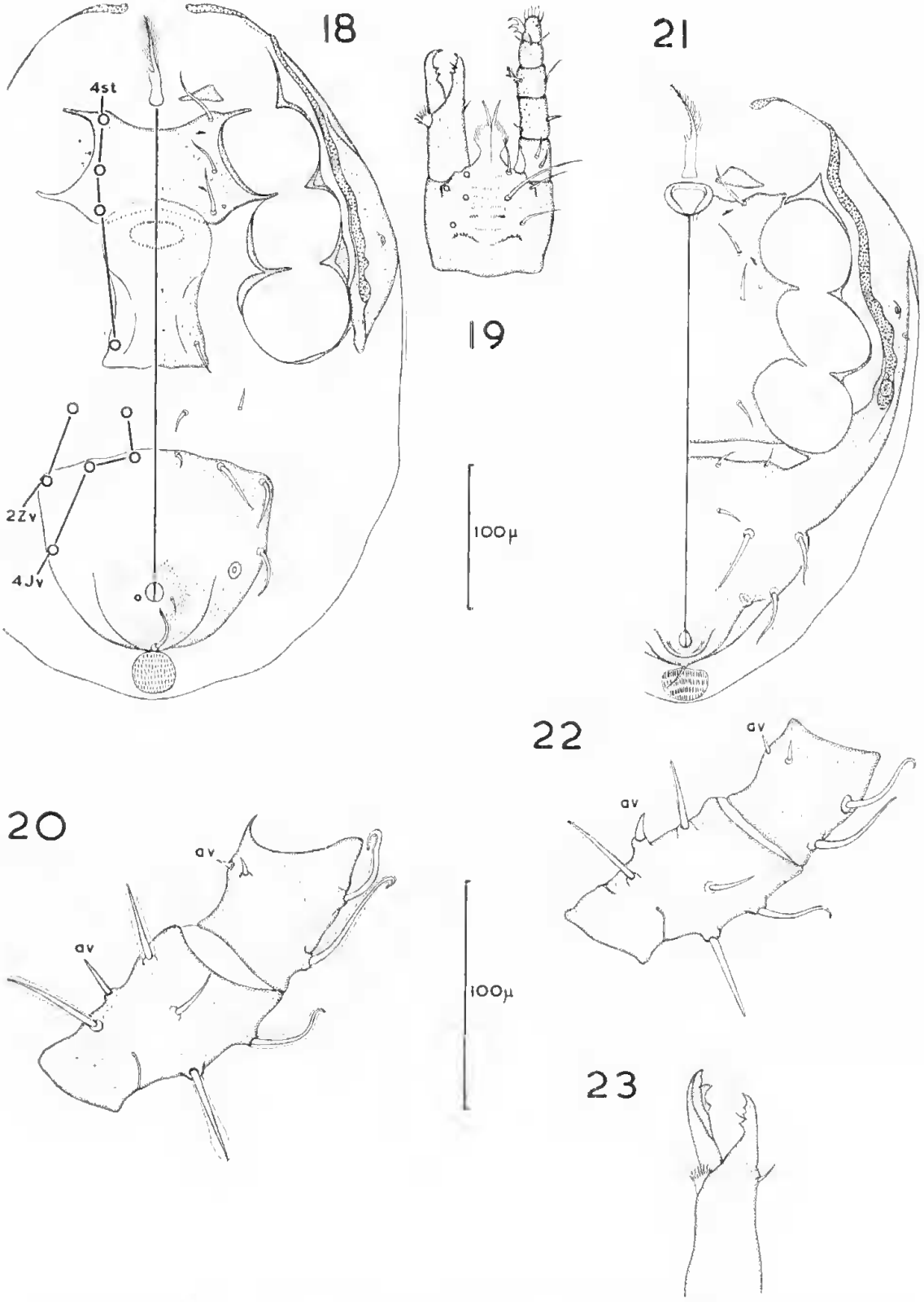
Subgenus **Evanssellus** Ryke, stat. n.

The two species, including a form of one species, are from Australasia. The adult range in idiosomal length from 420μ to 540μ.

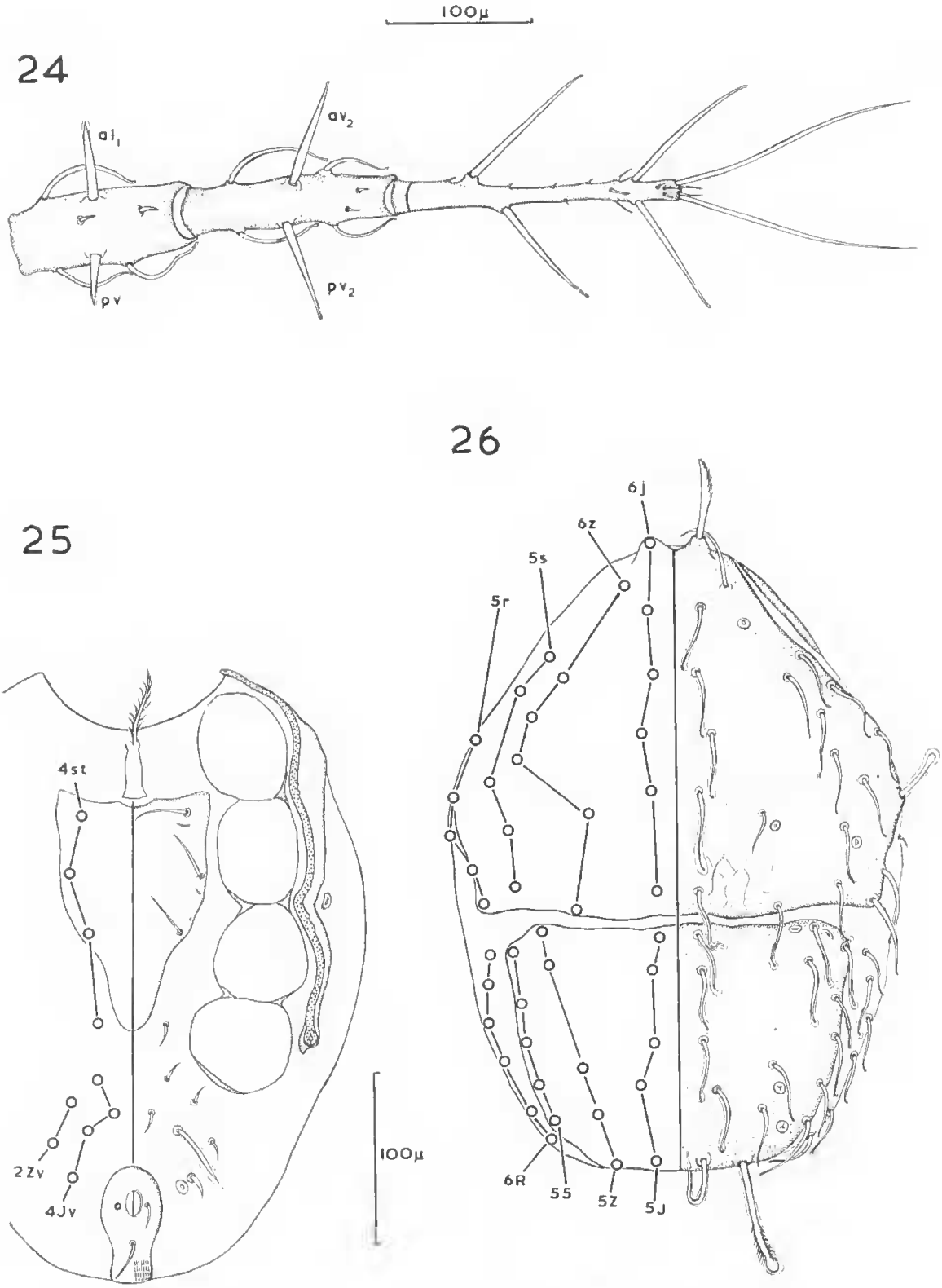
The following characters distinguish this subgenus from *Heterogamasus* sens. str. Movable digit of chelicera has two teeth. Central, tectum spine has single point at tip. Idiosoma flat dorsally, with anterior protruberance bearing vertical setae (*j*1). Postanal pad discrete. Paranal setae nearly level with posterior margin of anus. Peritrematic shield not reticulated, only markings are pits, that look similar to setal bases and in *H. foliatus* are mostly in a single line. Leg I has no pretarsus or ambulacrum in the adults or nymphs. Chaetotaxy of genu III and tibia III as in *Gamasellus*; *i.e.*, (2-4/2-1) and (2-3/2-1). The anterior spine on genu I of deutonymph and adult is lateral (*i.e.*, al_1), as in the protonymph, but on tibia I it is av_2 as in the adult of *Heterogamasus* sens. str. On femur IV, pd_2 (*pd* in protonymph) is much smaller than anterior dorsal setae. Male genu II not obviously armed, although *av* may be on a slight protruberance. May be holoventral shield in male as in *Heterogamasus*, or sternogenital shield can be separate from ventrianal shield, but peritrematic shield is always fused to ventrianal shield, which is still unusual when ventrianal shield is not fused to dorsal shield.



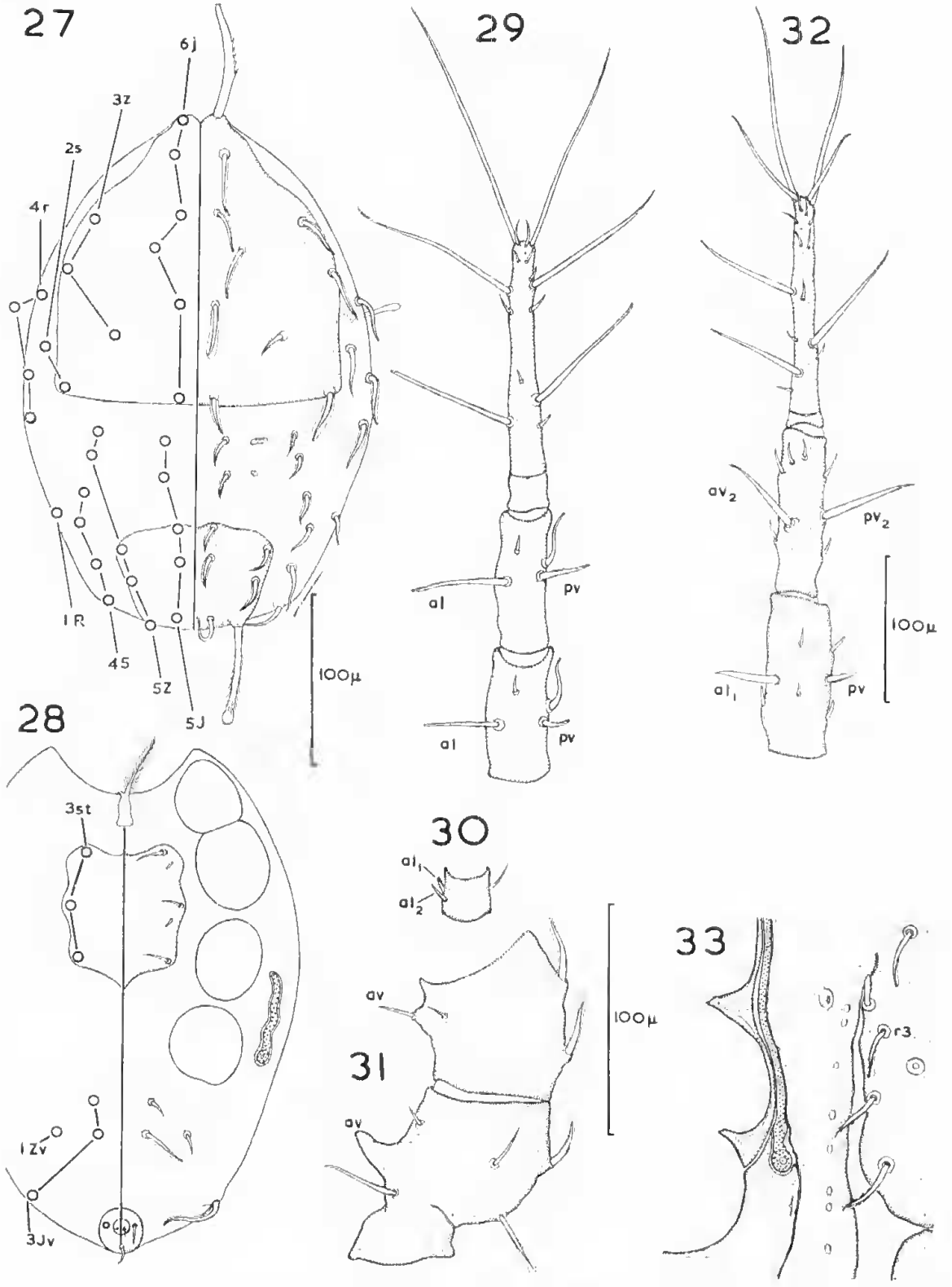
Figs. 15-17. *Heterogamasus* (*Evanssellus*) *medusa* sp. n., female.
15, dorsum; 16, lateral view of idiosoma; 17, dorsal view of distal segments from leg IV.



Figs. 18-23. *Heterogamasus* (*Evansscllus*) *medusa* sp. n.
18-20, female. 18, venter; 19, ventral view of gnathosoma; 20, femur II and genu II. 21-23, male. 21, venter; 22, femur II and genu II; 23, chelicera.



Figs. 24-26. *Heterogamasus* (*Evanssellus*) *medusa* sp. n.
24, female, distal segments from leg I. 25 and 26, deutonymph. 25, venter; 26, dorsum.



Figs. 27-33. 27-29, *Heterogamasus* (*Evanssellus*) *medusa* sp. n., protonymph. 27, dorsum; 28, venter; 29, distal segments of leg I.

30-33, *Heterogamasus* (*Evanssellus*) *foliatus* (Ryke), male. 30, palpgenu; 31, femur II and genu II; 32, distal segments of leg I; 33, area around stigma.

Heterogamasus (Evanssellus) foliatus (Ryke) comb. n.

1961, *Evanssellus foliatus* Ryke, 3, p. 245, fig. 1-9.

I have before me a paratype female and a paratype male from South Island and a female and three males from North Island, New Zealand. There are small differences between the mites from North Island and the types, but until more specimens are seen they are given infrasubspecific rank. The figures, and the description unless otherwise stated, are of the northern form.

Female. Idiosomal length, 520μ (paratype female, 540μ).

Besides slight differences in chaetomorphy, the northern form differs in *r*3 being on the dorsal shield instead of the peritrematic shield as in the paratype and the other *Heterogamasus* species. This female contains a larva, the claws and setae of which can be seen, suggesting that it is larviporous.

Male. Fig. 30-33. Idiosomal length, 440μ.

The movable digit of chelicera is shorter than fixed digit. On palpgenu al_1 is slightly pilose. As in female, *r*3 is on dorsal shield. In fig. 33 it can be seen that the setae in row *r* are not as leaf-like as in Ryke's (1961) drawing, which is true of the paratype to a lesser degree. Another difference is that *Z*4 in the northern form and paratype is subequal in length to the surrounding setae. Ryke (1961) compares the lateral fissure in the venter of the "*Ologamasus-Gamasiphis* group" males, with the ridge extending posteriorly from the *H. foliatus* stigma, when it should be compared with the broad fissure between the holoventral and dorsal shields. Seven large setae on tarsus I, of which four are terminal. Genu II has *av* on a small protruberance that is not present in the female.

Locality. New Zealand: type females and type males from beech litter, Queenstown, South Island, July, 1954, coll. not known; one female and three males from moss, Botanical Gardens, Wellington, North Island, 15th December, 1960, coll. D. C. M. Manson.

Heterogamasus (Evanssellus) medusa sp. n.

This species is unusual among the Rhodacaridae in that adults and nymphs have a pair of sternal setae missing. In the adults and deutonymph *st*4 is missing, but in the protonymph it must be *st*5 since *st*4 is not formed at this stage.

Female. Fig. 15-20 and 24. Idiosomal length, 470μ.

Faint, irregular markings on dorsal shield. All dorsal, idiosomal setae are on shields. Most dorsal setae are tentacle-like. Lateral setae *r*3 is very small. The ventrianal shield terminates anteriorly some way behind genital shield, leaving Jv_1 and Zv_1 on integument. There are six large setae on tarsus I, with two of them terminal.

Male. Fig. 21-23. Idiosomal length, 420μ.

The movable digit of the chelicera is longer than the fixed digit. Unlike the other two males the ventrianal shield is separate from the genitosternal shield. Leg II is hardly armed at all, *av* on femur being modified but still spine-like.

Deutonymph. Fig. 25-26. Idiosomal length, 380μ.

Unlike the adult, *r*2 is obviously different from the tentacle-like form of most of the dorsal setae. Otherwise besides changes in the shields on the venter, the deutonymph is like the adult.

Protonymph. Fig. 27-29. Idiosomal length, 310μ.

Chaetotaxy as shown in fig. 27 and 28. Chaetomorphy is also different from deutonymph. Dorsal setae not tentacle-like. *Jv*2 and *Jv*3 larger than other ventral setae.

Locality. Victoria, Australia: holotype female (LF79M1), allotype male (LF79M2), morphotype deutonymph (LF79M3), morphotype protonymph (LF79M4), four paratype females (LF79M5-8), and one paratype male (LF79M9), from moss and litter, among "tree ferns" and *Eucalyptus*, near Hordernvale, Cape Otway, 28th August, 1965, coll. F. J. Mitchell.

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ZUSAMMENFASSUNG

Heterogamasus Trägårdh wird redefiniert, und besteht aus zwei Untergattungen: *Heterogamasus* sens. str. aus Südamerika, und *Evanssellus* Ryke aus Australasien. Eine Bestimmungstafel für die fünf Arten wird beigefügt. Zwei neue Arten (*H.* (*H.*) *calcarellus* und *H.* (*E.*) *medusa*) werden beschreiben, uud die Beschreibungen der Typenart (*H.* (*H.*) *claviger* Trägårdh), *H.* (*H.*) *spinosissimus* (Balogh) und *H.* (*E.*) *foliatus* (Ryke) erweitert.